Spring Cloud로 개발하는 마이크로서비스 애플리케이션

목차

Part 1

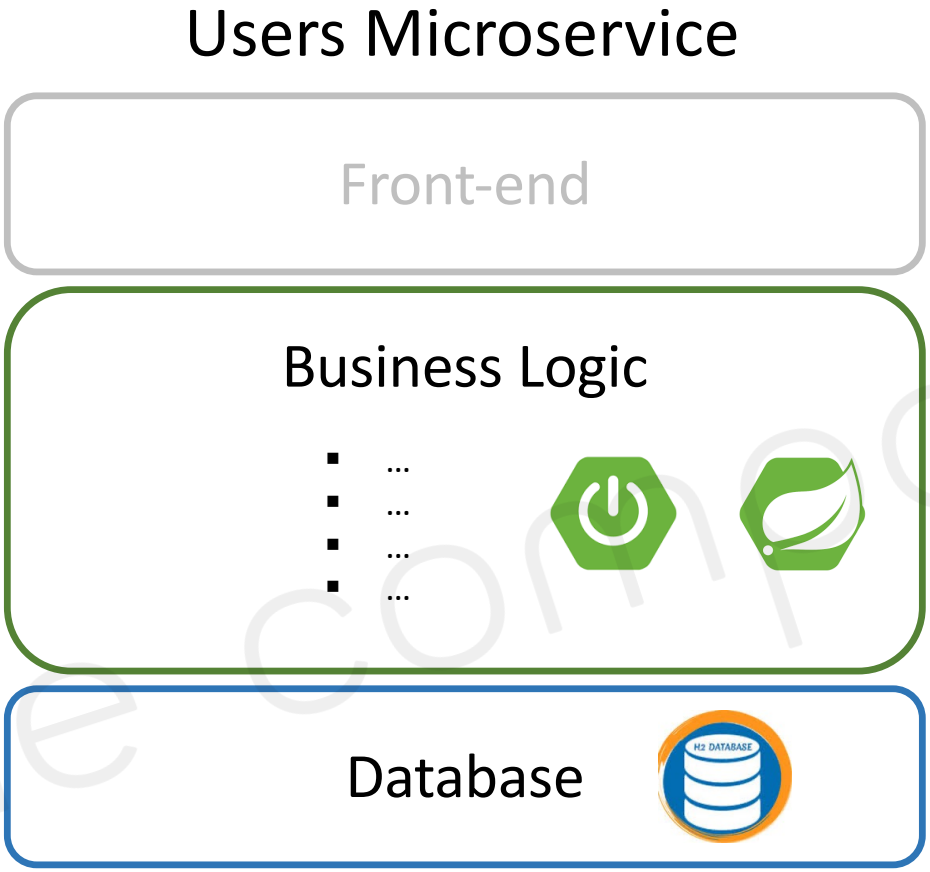
Section 5.

Catalogs, Orders Microservice

- Users Microservice 기능 추가
- Catalogs Microservice 프로젝트 생성
- Orders Microservice 프로젝트 생성

Users Microservice 기능 추가

- Features
  - ~~신규 회원 등록~~
  - 회원 로그인
  - 상세 정보 확인
  - 회원 정보 수정/삭제
  - 상품 주문
  - 주문 내역 확인



Users Microservice 기능 추가

- APIs

기능	URI (API Gateway 사용 시)	URI (API Gateway 미사용 시)	HTTP Method
~~사용자 정보 등록~~	~~/user-service/users~~	~~/users~~	~~POST~~
전체 사용자 조회	/user-service/users	/users	GET
사용자 정보, 주문 내역 조회	/user-service/users/***{user_id}***	/users/***{user_id}***	GET
~~작동 상태 확인~~	~~/user-service/users/health_check~~	~~/health_check~~	~~GET~~
~~환영 메시지~~	~~/user-service/users/welcome~~	~~/welcome~~	~~GET~~

```
{
    "name": "Dowon Lee",
    "email": "edowon0623@gmail.com",
    "pwd": "test1234"
}
```

```
{
    "userId": "95be247c-7812-4943-b0c9-47eaad744534",
    "name": "Dowon Lee",
    "email": "edowon0623@gmail.com",
    "orders": []
}
```

Users Microservice 기능 추가

- Root Request Mapping 정보 변경
  - UserController.java

```
@GetMapping("/health_check")
public String status(HttpServletRequest request) {
    return String.format("It's Working in User Service on Port %s", request.getServerPort());
}
```

Users Microservice 기능 추가

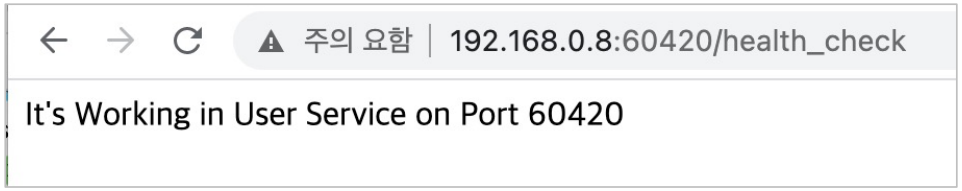
- API Gateway Service 변경 – application.yml (API Gateway service)
  - User service route 추가

```yaml
spring:
  application:
    name: gateway-service
  cloud:
    gateway:
      default-filters:
        - name: GlobalFilter
          args:
            baseMessage: Spring Cloud Gateway GlobalFilter
            preLogger: true
            postLogger: true
      routes:
        - id: user-service
          uri: lb://USER-SERVICE
          predicates:
            - Path=/user-service/**
```

Users Microservice 기능 추가

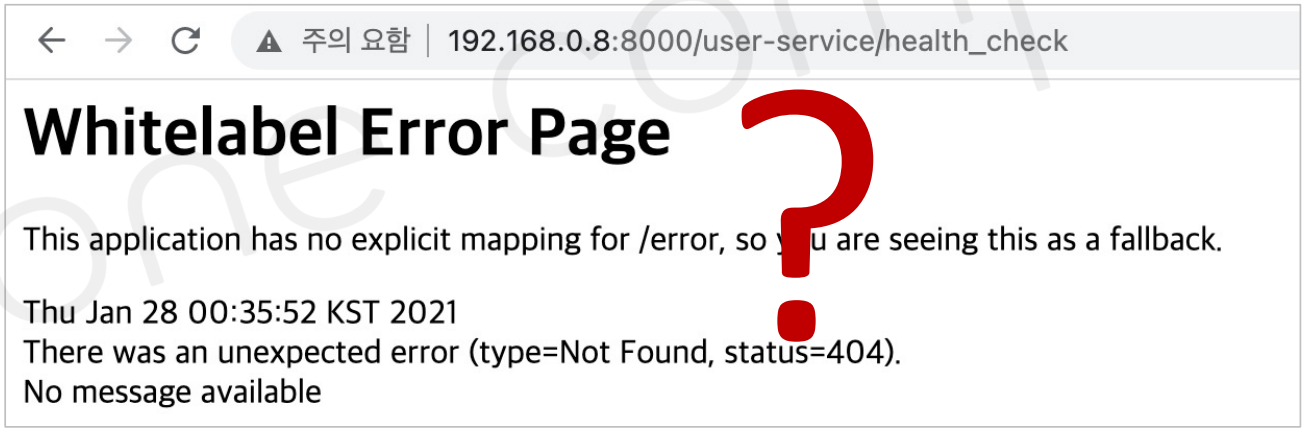
- 실행

Application	AMIs	Availability Zones	Status
GATEWAY-SERVICE	n/a (1)	(1)	UP (1) - 192.168.0.8:gateway-service:8000
USER-SERVICE	n/a (1)	(1)	UP (1) - user-service:d8c9a5408b14584d2220d1d718f95392



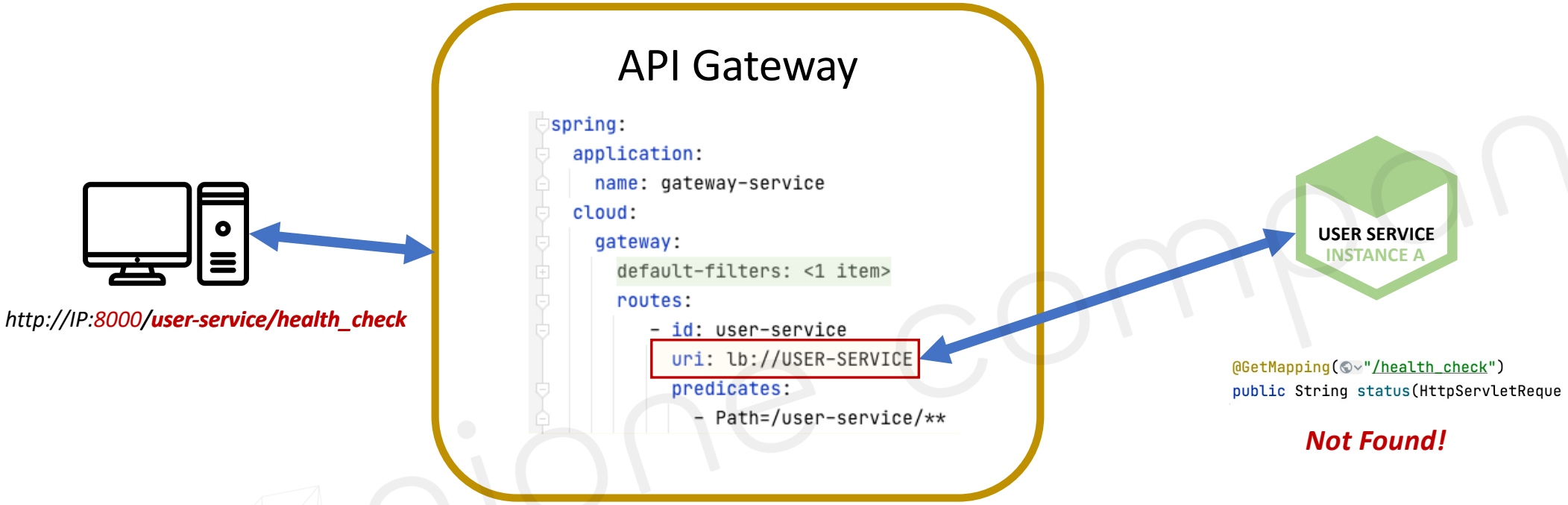
- **user-service 직접 호출**

- **API Gateway 호출**



Users Microservice 기능 추가

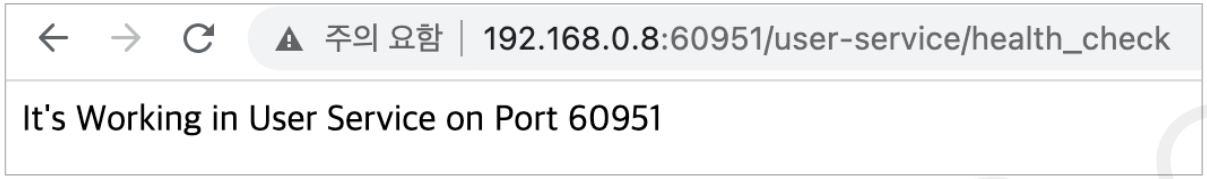
- Users Service의 URI와 API Gateway의 URI가 다름



Users Microservice 기능 추가

- Root Request Mapping 정보 변경
  - UserController.java

```
@GetMapping("/user-service/health_check")
public String status(HttpServletRequest request) {
    return String.format("It's Working in User Service on Port %s", request.getServerPort());
}
```



- **user-service 직접 호출**

- **API Gateway 호출**

Users Microservice 기능 추가

- ResponseUser.java, ResponseOrder.java

```java
@Data
@JsonInclude(JsonInclude.Include.NON_NULL)
public class ResponseUser {
    private String email;
    private String name;
    private String userId;

    private List<ResponseOrder> orders;
}
```

```java
@Data
public class ResponseOrder {
    private String productId;
    private Integer qty;
    private Integer unitPrice;
    private Integer totalPrice;
    private Date createdAt;

    private String orderId;
}
```

Users Microservice 기능 추가

- UserService.java, UserServiceImpl.java

```java
public interface UserService {
    UserDto createUser(UserDto userDto);
    UserDto getUserByUserId(String userId);
    Iterable<UserEntity> getUserByAll();
}
```

```java
@Override
public UserDto getUserByUserId(String userId) {
    UserEntity userEntity = userRepository.findByUserId(userId);

    if (userEntity == null)
        throw new UsernameNotFoundException("User not found");

    UserDto userDto = new ModelMapper().map(userEntity, UserDto.class);

    List<ResponseOrder> ordersList = new ArrayList<>();
    userDto.setOrders(ordersList);

    return userDto;
}

@Override
public Iterable<UserEntity> getUserByAll() {
    return userRepository.findAll();
}
```

Users Microservice 기능 추가

- UserController.java
  - 전체 사용자 목록 보기

```java
@GetMapping(value="/users")
public ResponseEntity<List<ResponseUser>> getUsers() {
    Iterable<UserEntity> userList = userService.getUserByAll();

    List<ResponseUser> result = new ArrayList<>();
    userList.forEach(v -> {
        result.add(new ModelMapper().map(v, ResponseUser.class));
    });

    return ResponseEntity.status(HttpStatus.OK).body(result);
}
```

Users Microservice 기능 추가

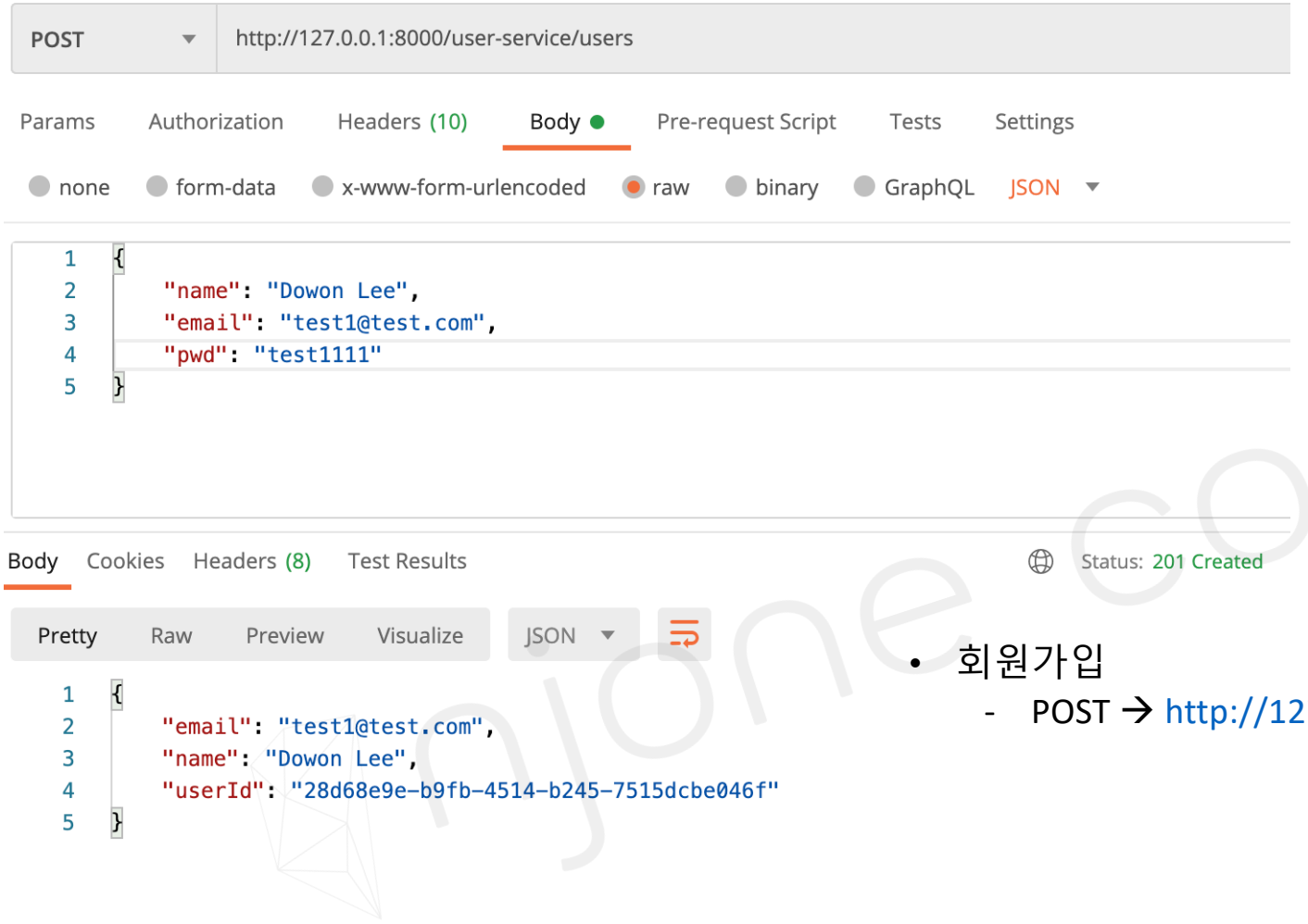
- UserController.java
  - 사용자 정세보기 + 주문 목록 보기

```
@GetMapping(value="/users/{userId}")
public ResponseEntity<ResponseUser> getUser(@PathVariable("userId") String userId) {
    UserDto userDto = userService.getUserByUserId(userId);
    ResponseUser returnValue = new ModelMapper().map(userDto, ResponseUser.class);

    return ResponseEntity.status(HttpStatus.OK).body(returnValue);
}
```

Users Microservice 기능 추가

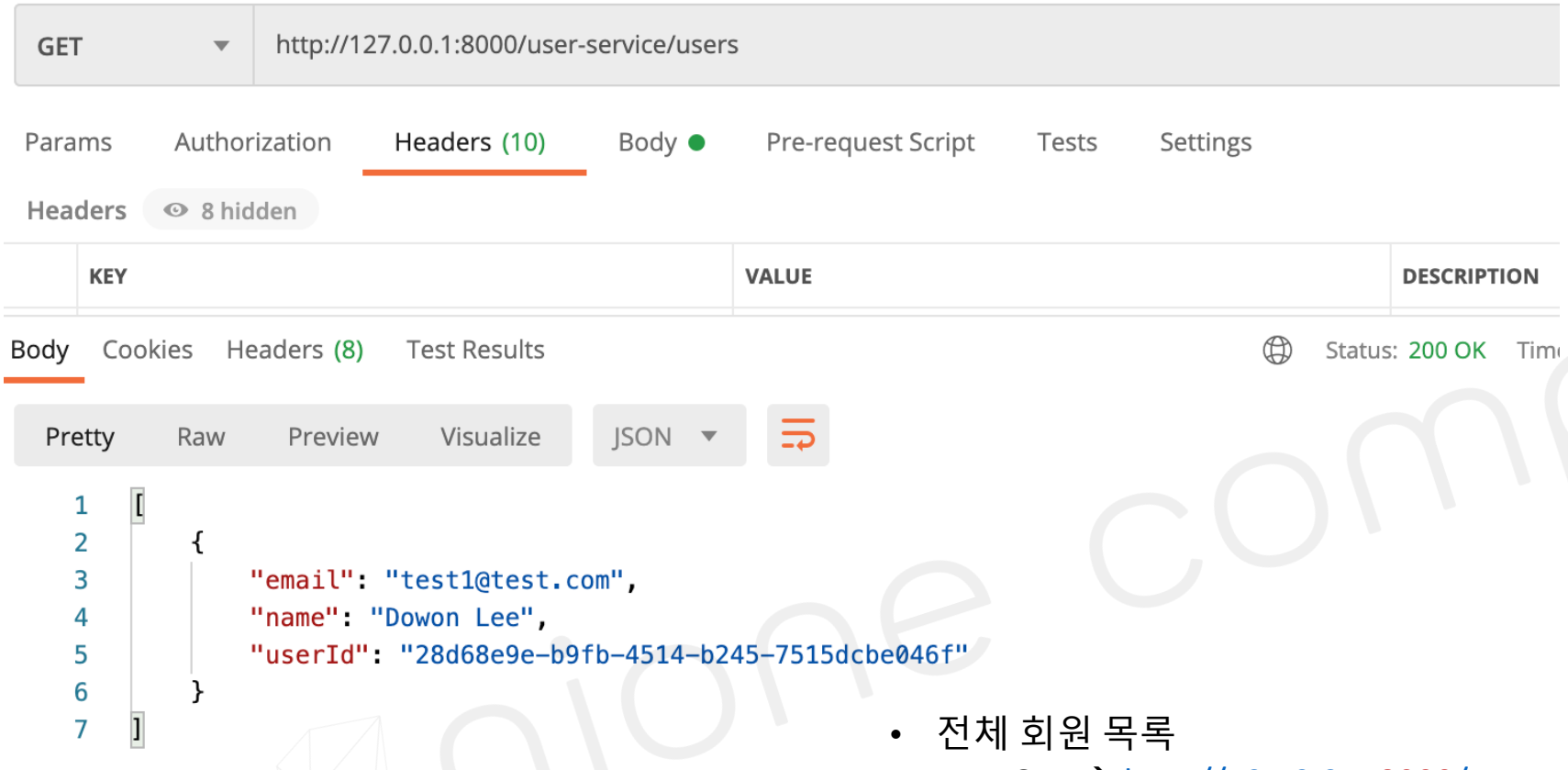
- 실행



- 회원가입
  - POST → http://127.0.0.1:8000/user-service/users

Users Microservice 기능 추가

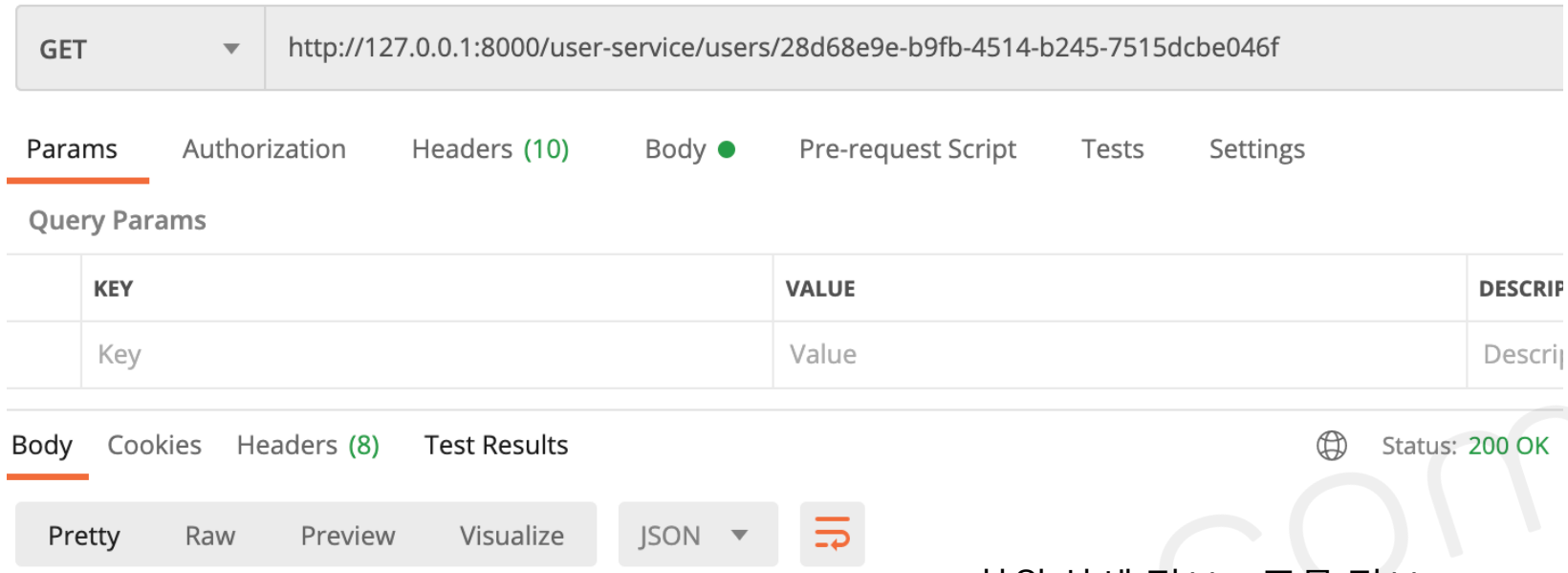
- 실행



- 전체 회원 목록
  - GET → http://127.0.0.1:8000/user-service/users

Users Microservice 기능 추가

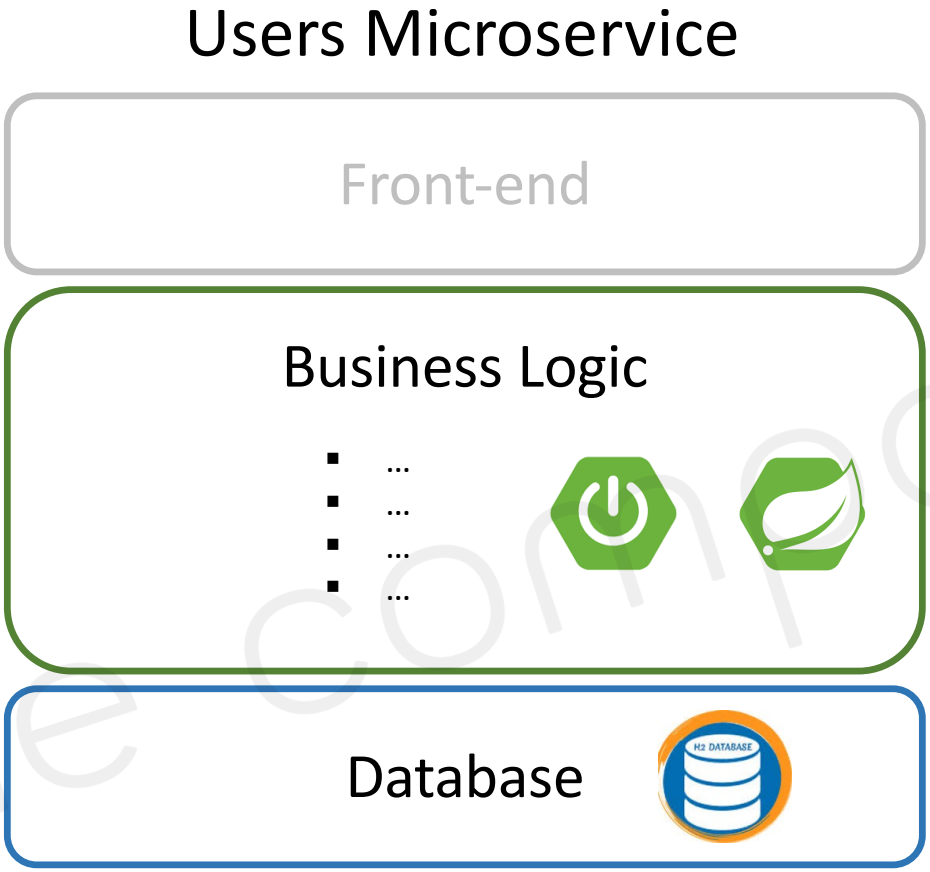
- 실행



- 회원 상세 정보 + 주문 정보
  - GET → http://127.0.0.1:8000/user-service/users/{회원ID}

Catalogs Microservice 추가

- Features
  - ~~신규 회원 등록~~
  - 회원 로그인
  - ~~상세 정보 확인~~
  - 회원 정보 수정/삭제
  - 상품 주문
  - ~~주문 내역 확인~~



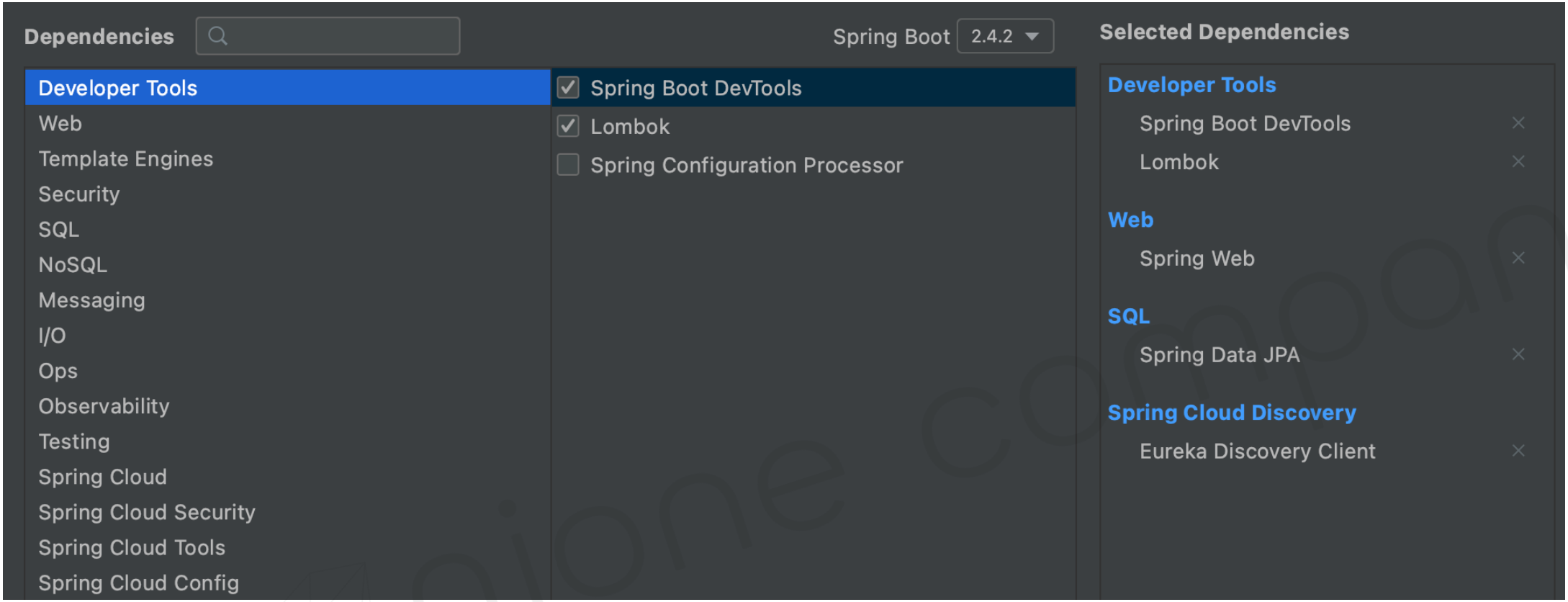
Catalogs Microservice 추가

- APIs

기능	마이크로서비스	URI (API Gateway 사용 시)	HTTP Method
상품 목록 조회	Catalogs Microservice	/catalog-service/catalogs	GET
사용자 별 상품 주문	Orders Microservice	/order-service/**{user_id}**/orders	POST
사용자 별 주문 내역 조회	Orders Microservice	/order-service/**{user_id}**/orders	GET

Catalogs Microservice 추가

- 프로젝트 생성



Catalogs Microservice 추가

- 프로젝트 생성
  - Dependencies 추가

```
<dependency>
    <groupId>com.h2database</groupId>
    <artifactId>h2</artifactId>
    <version>1.3.176</version>
    <scope>runtime</scope>
</dependency>

<dependency>
    <groupId>org.modelmapper</groupId>
    <artifactId>modelmapper</artifactId>
    <version>2.3.8</version>
</dependency>
```

Catalogs Microservice 추가

- 프로젝트 생성
  - application.yml 파일

```yaml
server:
  port: 0

spring:
  application:
    name: catalog-service
  h2:
    console:
      enabled: true
      settings:
        web-allow-others: true
      path: /h2-console
```

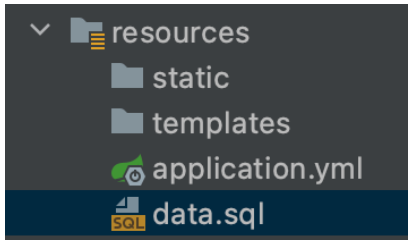
```yaml
logging:
  level:
    com.example.catalogservice: DEBUG
```

```yaml
  jpa:
    hibernate:
      ddl-auto: create-drop
    show-sql: true
    generate-ddl: true
    database: h2
    defer-datasource-initialization: true
  datasource:
    driver-class-name: org.h2.Driver
    url: jdbc:h2:mem:testdb
    username: sa
    password:

eureka:
  instance:
    instance-id: ${spring.application.name}:
```

Catalogs Microservice 추가

- 프로젝트 생성
  - data.sql




```
insert into catalog(product_id, product_name, stock, unit_price)
            values('CATALOG-0001', 'Berlin', 100, 1500);
insert into catalog(product_id, product_name, stock, unit_price)
            values('CATALOG-0002', 'Tokyo', 100, 900);
insert into catalog(product_id, product_name, stock, unit_price)
            values('CATALOG-0003', 'Stockholm', 100, 1200);
```

```
2021-01-27 09:32:49.733  INFO 70554 --- [  restartedMain] org.hiber
2021-01-27 09:32:49.799  INFO 70554 --- [  restartedMain] o.hibernat
2021-01-27 09:32:49.856  INFO 70554 --- [  restartedMain] org.hiber
Hibernate: drop table if exists catalog CASCADE
Hibernate: create table catalog (id bigint generated by default as i
Hibernate: alter table catalog add constraint UK_9gggyslu2usn0rxs32r
```

```
: HHH000412: Hibernate ORM core version 5.4.27.
: HCANN000001: Hibernate Commons Annotations {5
: HHH000400: Using dialect: org.hibernate.diale

efault CURRENT_TIMESTAMP not null, product_id v
```

SELECT * FROM CATALOG;

ID	CREATED_AT	PRODUCT_ID	PRODUCT_NAME	STOCK	UNIT_PRICE
1	2021-01-27 09:32:50.207	CATALOG-0001	Berlin	100	1500
2	2021-01-27 09:32:50.208	CATALOG-0002	Tokyo	100	900
3	2021-01-27 09:32:50.208	CATALOG-0003	Stockholm	100	1200

(3 rows, 6 ms)

Catalogs Microservice 추가

- CatalogEntity.java, CatalogRepository.java

```java
@Data
@Entity
@Table(name="catalog")
public class CatalogEntity implements Serializable {
    @Id
    @GeneratedValue(strategy=GenerationType.IDENTITY)
    private long id;

    @Column(nullable = false, length = 120, unique = true)
    private String productId;
    @Column(nullable = false)
    private String productName;
    @Column(nullable = false)
    private Integer stock;
    @Column(nullable = false)
    private Integer unitPrice;

    @Column(nullable = false, updatable = false, insertable = false)
    @ColumnDefault( value = "CURRENT_TIMESTAMP" )
    private Date createdAt;
}
```

```java
public interface CatalogRepository extends CrudRepository<CatalogEntity, Long> {
    CatalogEntity findByProductId(String productId);
}
```

Catalogs Microservice 추가

- CatalogDto.java, ResponseCatalog.java

```java
@Data
public class CatalogDto implements Serializable {
    private String productId;
    private Integer qty;
    private Integer unitPrice;
    private Integer totalPrice;

    private String orderId;
    private String userId;
}
```

```java
@Data
@JsonInclude(JsonInclude.Include.NON_NULL)
public class ResponseCatalog {
    private String productId;
    private String productName;
    private Integer stock;
    private Integer unitPrice;
    private Date createdAt;
}
```

Catalogs Microservice 추가

- CatalogService.java, CatalogServiceImpl.java

```java
public interface CatalogService {
    Iterable<CatalogEntity> getAllCatalogs();
}
```

```java
@Service
@Slf4j
public class CatalogServiceImpl implements CatalogService {
    CatalogRepository repository;

    Environment env;

    @Autowired
    public CatalogServiceImpl(CatalogRepository repository,
                              Environment env) {
        this.repository = repository;
        this.env = env;
    }

    @Override
    public Iterable<CatalogEntity> getAllCatalogs() {
        return repository.findAll();
    }
}
```

Catalogs Microservice 추가

- CatalogController.java

```java
@RestController
@RequestMapping("/catalog-service")
public class CatalogController {
    private Environment env;
    CatalogService catalogService;

    @Autowired
    public CatalogController(Environment env, CatalogService catalogService) {
        this.env = env;
        this.catalogService = catalogService;
    }

    @GetMapping("/health_check")
    public String status(HttpServletRequest request) {
        return String.format("It's Working in Catalog Service on Port %s", request.getServerPort());
    }
```

Catalogs Microservice 추가

- CatalogController.java

```
    @GetMapping(value="/catalogs")
    public ResponseEntity<List<ResponseCatalog>> getCatalogs() {
        Iterable<CatalogEntity> orderList = catalogService.getAllCatalogs();

        List<ResponseCatalog> result = new ArrayList<>();
        orderList.forEach(v -> {
            result.add(new ModelMapper().map(v, ResponseCatalog.class));
        });

        return ResponseEntity.status(HttpStatus.OK).body(result);
    }
}
```

Catalogs Microservice 추가

- API Gateway Service에 Service 등록

```yaml
routes:
  - id: user-service
    uri: lb://USER-SERVICE
    predicates:
      - Path=/user-service/**
  - id: catalog-service
    uri: lb://CATALOG-SERVICE
    predicates:
      - Path=/catalog-service/**
```

- Test

Application	AMIs	Availability Zones	Status
CATALOG-SERVICE	n/a (1)	(1)	UP (1) - catalog-service:d859e8691c06622627ee783714b33d88
GATEWAY-SERVICE	n/a (1)	(1)	UP (1) - 192.168.0.8:gateway-service:8000

Catalogs Microservice 추가

- Test

GET | http://127.0.0.1:8000/catalog-service/catalogs

- 상품 목록
  - GET → http://127.0.0.1:8000/catalog-service/catalogs


```
[
    {
        "productId": "CATALOG-0001",
        "productName": "Berlin",
        "stock": 100,
        "unitPrice": 1500,
        "createdAt": "2021-01-27T00:32:50.207+00:00"
    },
    {
        "productId": "CATALOG-0002",
        "productName": "Tokyo",
        "stock": 100,
        "unitPrice": 900,
        "createdAt": "2021-01-27T00:32:50.208+00:00"
    },
```

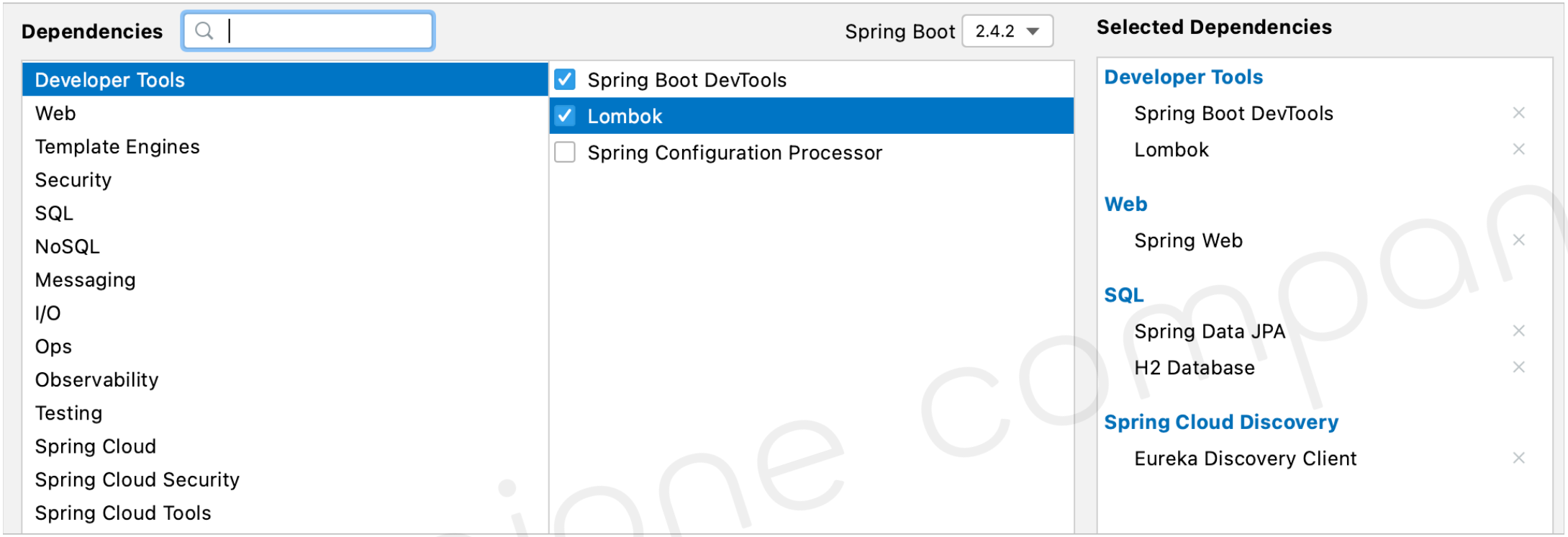
Orders Microservice 추가

- APIs

기능	마이크로서비스	URI (API Gateway 사용 시)	HTTP Method
~~상품 목록 조회~~	~~Catalogs Microservice~~	~~/catalog-service/catalogs~~	~~GET~~
사용자 별 상품 주문	Orders Microservice	/order-service/**{user_id}**/orders	POST
사용자 별 주문 내역 조회	Orders Microservice	/order-service/**{user_id}**/orders	GET

Orders Microservice 추가

- 프로젝트 생성



Orders Microservice 추가

- 프로젝트 생성
  - Dependencies 추가

```
<dependency>
    <groupId>com.h2database</groupId>
    <artifactId>h2</artifactId>
    <version>1.3.176</version>
    <scope>runtime</scope>
</dependency>
<dependency>
    <groupId>org.modelmapper</groupId>
    <artifactId>modelmapper</artifactId>
    <version>2.3.8</version>
</dependency>
```

Orders Microservice 추가

- 프로젝트 생성
  - application.yml 파일

```yaml
server:
  port: 0

spring:
  application:
    name: order-service
  h2:
    console:
      enabled: true
      settings:
        web-allow-others: true
      path: /h2-console
  jpa:
    hibernate:
      ddl-auto: update
  datasource:
    driver-class-name: org.h2.Driver
    url: jdbc:h2:mem:testdb

eureka:
  client:
    service-url:
      defaultZone: http://localhost:8761/eureka
  instance:
    instanceId: ${spring.application.name}:${spring.application.instance_id:${rando

logging:
  level:
    com.example.orderservice: DEBUG
```

Orders Microservice 추가

- OrderEntity.java, OrderRepository.java

```java
@Data
@Entity
@Table(name="orders")
public class OrderEntity implements Serializable {
    @Id
    @GeneratedValue
    private long id;

    @Column(nullable = false, length = 120)
    private String productId;
    @Column(nullable = false)
    private Integer qty;
    @Column(nullable = false)
    private Integer unitPrice;
    @Column(nullable = false)
    private Integer totalPrice;

    @Column(nullable = false)
    private String userId;
    @Column(nullable = false, unique = true)
    private String orderId;

    @Column(nullable = false, updatable = false, insertable = false)
    @ColumnDefault( value = "CURRENT_TIMESTAMP" )
    private Date createdAt;
}
```

```java
public interface OrdersRepository extends CrudRepository<OrderEntity, Long> {
    OrderEntity findByOrderId(String orderId);
    Iterable<OrderEntity> findByUserId(String userId);
}
```

Orders Microservice 추가

- OrderDto.java, ResponseOrder.java

```java
@Data
public class OrderDto implements Serializable {
    private String productId;
    private Integer qty;
    private Integer unitPrice;
    private Integer totalPrice;

    private String orderId;
    private String userId;
}
```

```java
@Data
@JsonInclude(JsonInclude.Include.NON_NULL)
public class ResponseOrder {
    private String productId;
    private Integer qty;
    private Integer unitPrice;
    private Integer totalPrice;
    private Date createdAt;

    private String orderId;
}
```

Orders Microservice 추가

- OrderService.java, OrderServiceImpl.java

```java
public interface OrdersService {
    OrderDto createOrder(OrderDto orderDetails);
    OrderDto getOrderByOrderId(String orderId);
    Iterable<OrderEntity> getOrdersByUserId(String userId);
}
```

```java
@Override
public OrderDto createOrder(OrderDto orderDetails) {
    orderDetails.setOrderId(UUID.randomUUID().toString());
    orderDetails.setTotalPrice(orderDetails.getQty() * orderDetails.getUnitPrice());
    ModelMapper modelMapper = new ModelMapper();
    modelMapper.getConfiguration().setMatchingStrategy(MatchingStrategies.STRICT);

    OrderEntity orderEntity = modelMapper.map(orderDetails, OrderEntity.class);

    repository.save(orderEntity);

    OrderDto returnValue = modelMapper.map(orderEntity, OrderDto.class);
    return returnValue;
}

@Override
public OrderDto getOrderByOrderId(String orderId) {
    OrderEntity orderEntity = repository.findByOrderId(orderId);
    OrderDto orderDto = new ModelMapper().map(orderEntity, OrderDto.class);

    return orderDto;
}

@Override
public Iterable<OrderEntity> getOrdersByUserId(String userId) {
    return repository.findByUserId(userId);
}
```

Orders Microservice 추가

- OrderController.java

```
@PostMapping(value="/{userId}/orders")
public ResponseEntity<ResponseOrder> createOrder(@PathVariable("userId") String userId,
                                                 @RequestBody RequestOrder orderDetails) {

    ModelMapper modelMapper = new ModelMapper();
    modelMapper.getConfiguration().setMatchingStrategy(MatchingStrategies.STRICT);

    OrderDto orderDto = modelMapper.map(orderDetails, OrderDto.class);
    orderDto.setUserId(userId);
    OrderDto createDto = ordersService.createOrder(orderDto);
    ResponseOrder returnValue = modelMapper.map(createDto, ResponseOrder.class);

    return ResponseEntity.status(HttpStatus.CREATED).body(returnValue);
}
```

Orders Microservice 추가

- OrderController.java

```
@GetMapping(value="/{userId}/orders")
public ResponseEntity<List<ResponseOrder>> getOrder(@PathVariable("userId") String userId) {
    Iterable<OrderEntity> orderList = ordersService.getOrdersByUserId(userId);

    List<ResponseOrder> result = new ArrayList<>();
    orderList.forEach(v -> {
        result.add(new ModelMapper().map(v, ResponseOrder.class));
    });

    return ResponseEntity.status(HttpStatus.OK).body(result);
}
```

Orders Microservice 추가

- API Gatewway Service에 Service 등록

```
routes:
  - id: order-service
    uri: lb://ORDER-SERVICE
    predicates:
      - Path=/order-service/**
```

- Test

Instances currently registered with Eureka

Application	AMIs	Availability Zones	Status
GATEWAY-SERVICE	n/a (1)	(1)	UP (1) - 192.168.0.8:gateway-service:8000
ORDER-SERVICE	n/a (1)	(1)	UP (1) - order-service:3fc09ea7148e4c25f2c2ed68ce346282
USER-SERVICE	n/a (1)	(1)	UP (1) - user-service:68799d7ffb36e34a55751447d3553b12

Orders Microservice 추가

- Test

POST 127.0.0.1:8000/order-service/bbbe4241-943d-48f7-988e-809a55781496/orders

Params Authorization Headers (8) Body Pre-request Script Tests Settings

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1  {
2      "productId": "CATALOG-0002",
3      "qty": 10,
4      "unitPrice": 900
5  }
```

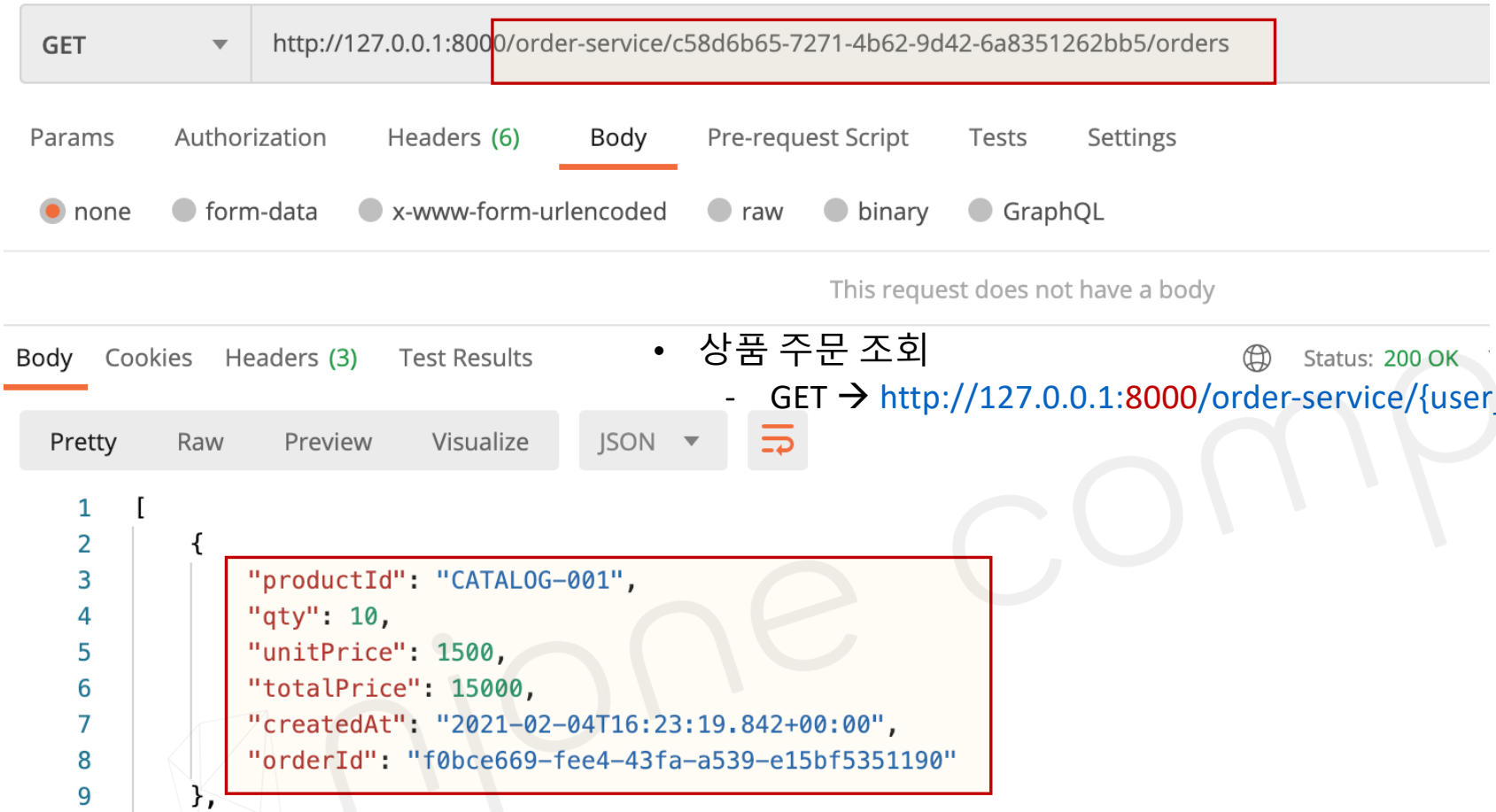
- 상품 주문
  - POST → http://127.0.0.1:8000/order-service/{user_id}/orders

Pretty Raw Preview Visualize JSON

```
1  {
2      "productId": "CATALOG-0002",
3      "qty": 10,
4      "unitPrice": 900,
5      "totalPrice": 9000,
6      "orderId": "67419444-be51-40dc-a3e5-dcdb728d8780"
7  }
```

Orders Microservice 추가

- Test



- 상품 주문 조회
  - GET → http://127.0.0.1:8000/order-service/{user_id}/orders